

# Alternative Estimates of Corporate Depreciation and Profits: Part I

**C**ORPORATE capital consumption allowances in the national income and product accounts are based primarily on the depreciation claimed by corporations under the Federal tax laws and regulations.<sup>1</sup> Because of the many changes in these laws and regulations since 1940, it has become increasingly difficult to analyze not only the depreciation data but also the profits figures shown in the accounts. For some types of analyses, it is desirable to use instead figures based on depreciation methods and service lives that are consistent over time.

The valuation of depreciation poses another problem whose solution requires depreciation estimates that differ from those published. Depreciation in the national accounts is valued in terms of the historical cost of assets and thus reflects a mixture of the prices of the various years in which the investments were made. For this reason, neither corporate depreciation nor corporate profits are comparable over time, nor are they comparable with other components of the accounts for any given year.

The main purpose of this study is an evaluation of long-term trends in profits. It involves the derivation of consistent measures of corporate depreciation that can be substituted for those in the national accounts in order to obtain estimates of corporate profits unaffected by changes in depreciation practices. It also involves the computation of depreciation in terms of current

The many changes in the laws and regulations that have liberalized depreciation practices since the start of World War II have made it difficult to interpret long-term trends in corporate depreciation and profits. This article is the first of a two-part study whose primary purpose is to assess trends in corporate profits after making allowances for these changes. The article presents a set of calculations that show the importance of the major changes in depreciation practices. In the period 1941-66, corporate depreciation is estimated to have totaled \$60 billion to \$85 billion more than it would have with pre-World War II practices. The second part, which will appear in a later issue, will assess trends in profits from 1929 to 1966 by providing alternative estimates of depreciation based on depreciation methods and service lives that are consistent over time.

prices. Several alternative measures of depreciation and corresponding profits estimates have been prepared because a wide range of possibilities is open to the analyst—depending on the methods of depreciation used and the assumptions made as to service lives of assets, in addition to the choice of asset valuation.

The results of the study are being presented in two articles. This article, part I, is concerned solely with depreciation. It develops a methodology by which the corporate depreciation reported to the Internal Revenue Service (IRS) can be approximated by the use of time series on corporate investment underlying the national accounts. This makes it possible to examine the effects of the major changes made in depreciation practices since the start of World War II. These consist of three administrative or statutory changes—the 60-month amortization of defense facilities

first permitted during World War II, the introduction of accelerated methods of depreciation in 1954, and the 1962 Guidelines—and a fourth change, which was the gradual shortening of service lives in the 10 to 20 years prior to 1962. Because of the uncertainties associated with this gradual reduction in service lives, it was not possible to present a single approximation; instead, three approximations are provided. Part I also presents an appendix that includes a discussion of the procedures and data used in the study.

Part II, which will be published in a later issue of the *Survey*, presents several alternative estimates of depreciation that eliminate the effects of changes in depreciation practices; the data are given in both historical and current costs. The alternative estimates are substituted for the capital consumption allowances in the national accounts to derive alternative estimates of corporate profits. The alternatives are compared with published profits, and for each, the ratios of profits to gross corporate product and to income originating in corporations are computed over time. This part of the study extends and revises a similar analysis that appeared in the October 1963 *Survey*.<sup>2</sup>

## Major findings (part I)

The changes in depreciation practices since 1940 have permitted corporations to recover the costs of fixed investment more rapidly than was formerly the case. With a rising investment stream, this liberalization has yielded substantially larger depreciation allowances than would have arisen from the depreciation practices in effect before

1. Capital consumption allowances of corporations in the national income and product accounts are somewhat more comprehensive than depreciation claimed on corporate tax returns. (See appendix table C for the relationship between corporate depreciation reported to the Internal Revenue Service, corporate capital consumption allowances in the national accounts, and the concept used in this article.)

2. Murray Brown, "Depreciation and Corporate Profits," *SURVEY OF CURRENT BUSINESS*, October 1963.

World War II. In the period 1941-66, corporate depreciation allowances (excluding depreciation on farm and residential properties) are estimated to have totaled \$60 billion to \$85 billion more than they would have with the pre-World War II practices (table 1).

During World War II and during and after the Korean war, investment in defense facilities could be amortized over 60 months. Amortization has contributed about \$9 billion more in depreciation than would have resulted from the use of standard service lives. Amortization based on 60 months has run its course since this program was discontinued at the end of 1959. The net effect of amortization on depreciation became negative in 1961 and will remain so until the facilities so amortized reach the end of their service lives. At that time, the net effect on depreciation will have balanced out at zero.

Under the Revenue Act of 1954, corporations were permitted to use accelerated methods of depreciation for new investment as an alternative to the straight line formula. In the 1954-66 period, the new methods added about \$28 billion to the depreciation charges that would have resulted had all corporations continued to use the straight line formula.

The *Depreciation Guidelines and Rules* issued by the Treasury in 1962 permitted corporations to make several changes, the most important of which allowed depreciation of investment in new and existing equipment to be calculated over shorter service lives than had been used previously. The use of the Guidelines is estimated to have added about \$10 billion to depreciation charges in the 1962-66 period.

Reductions in tax service lives in the 10 to 20 years prior to the Guidelines

also increased depreciation charges. Depending upon the assumptions as to the timing and reduction in service lives, the additional depreciation in the 1941-66 period is estimated to range from \$15 billion (approximation III) to \$40 billion (approximation I). The "correct" figure is likely to be near the \$40 billion of approximation I. This approximation is based on the assumption that tax service lives decreased over a long period, from 100 percent of Bulletin F in 1940, to 75 percent of Bulletin F lives in the mid-fifties. The study found less support for the other approximations, which are based on assumptions that tax service lives were constant throughout the 1940's.

In 1966, between \$6½ billion and

\$9 billion of the \$36 billion of corporate depreciation allowances was due to the liberalization in depreciation practices since 1940 (chart 6). Of this amount, the accelerated depreciation formulas accounted for about \$3½ billion, the Guideline service lives for about \$1½ billion, and the pre-Guideline shortening of service lives for \$2 billion to \$4½ billion. Offsetting these additional amounts was about \$½ billion attributable to the negative effect of 60-month amortization of defense facilities. Correspondingly, corporate profits before taxes, at about \$80 billion in 1966, were from \$6½ billion to \$9 billion less than they would have been in the absence of the changes in depreciation practices.

## Tax Depreciation

This section presents the results of a procedure that attempts to approximate the corporate depreciation and amortization reported to the IRS. The computations make use of OBE's historical time series on investment flows together with certain assumptions as to the corporate share of investment, depreciation methods, and service lives. The computed estimates include allowances for the introduction of accelerated methods in 1954, the Guideline lives in 1962, the reductions in service lives made prior to the introduction of the Guidelines, and the 60-month amortization.

The depreciation figures with which the computed estimates are compared exclude farm depreciation and depreciation on residential property owned by

corporations, but include estimates of accidental damage to fixed capital as estimated in the national income accounts. They will be referred to as NIA-IRS depreciation. (See appendix table C for their relationship to IRS corporate depreciation and corporate capital consumption allowances in the national accounts.) The estimates computed from the corporate investment data will be referred to as the approximations.

A close fit to the NIA-IRS depreciation series may be taken as evidence that the computed depreciation represents essentially the same asset base as underlies NIA-IRS depreciation and that the assumptions regarding service lives and methods of depreciation correspond to those actually used by corporations in reporting to IRS. It would also mean that we can have confidence in our estimates of the effects of changes in depreciation practices since World War II that are discussed in the article and in the alternative measures of depreciation to be presented in part II of the study.

The laws and regulations governing the reporting of depreciation to IRS and the basis for selecting the deprecia-

Table 1. Depreciation Resulting From Liberalization in Depreciation Practices Since 1940  
(Billions of dollars)

	60-month amortization of defense facilities	Accelerated depreciation	Guideline service lives	Gradual shortening of service lives		Total	
				Approxima- tion I	Approxima- tion III	Approxima- tion I	Approxima- tion III
1941-46.....	4.4			0.1		4.5	4.4
1947-53.....	-1.0			2.4		1.3	-1.0
1954-61.....	3.2	15.8		17.4	8.1	38.4	37.1
1962-66.....	-3.0	18.0	9.6	10.6	8.0	41.2	30.6
Total, 1941-66.....	3.0	27.8	9.6	30.5	15.1	55.9	61.5

tion methods and service lives used to compute the approximations are discussed briefly in the following sections.<sup>3</sup>

### Methods of Depreciation

Until 1954, most investment was depreciated by the straight line method, in which the value of the asset is depreciated in equal annual amounts over its service life. There was very little use of other methods, such as the units-of-production method and the declining balance method at 1½ times the applicable straight line rate. Accordingly, in the approximations all investment prior to 1954 was depreciated with the straight line formula.

The Internal Revenue Code of 1954 permitted businessmen to depreciate new investment made in 1954 and subsequent years with the declining balance method at twice the applicable straight line rate (double-declining balance) and with the sum-of-the-years-digits method. As compared with straight line depreciation, both of these methods (described more fully in the appendix), permit the businessman to recover more of an asset's cost in the early years of its life. To approximate the introduction of these accelerated methods, about 30 percent of total new investment in 1954 was depreciated with the double-declining balance formula, and the proportion was gradually increased to about 65 percent in 1960 and thereafter; the proportions are shown separately for manufacturing and nonmanufacturing in the table below. The remaining investment in these years was depreciated with the straight line formula.

3. A more thorough discussion of tax depreciation practices may be found in the following: Eugene L. Grant and Paul T. Norton, *Depreciation*, Ronald Press Co., 1955; Frederick W. Stevenson, "Tax Depreciation and Business Resources," *Conference Board Record*, National Industrial Conference Board, July and September 1965 and March 1966; George Terborgh, *Realistic Depreciation Policy*, Machinery and Allied Products Institute, 1944; George Terborgh, *The Fading Scent of Corporate Tax Depreciation*, Machinery and Allied Products Institute, 1946; Norman B. Ture, *Accelerated Depreciation in the United States 1954-60*, National Bureau of Economic Research, 1967; U.S. Treasury Department, Internal Revenue Service, *Bulletin F (Revised January 1941) Income Tax, Depreciation and Obsolescence, Estimated Useful Lives and Depreciation Rates*; U.S. Treasury Department, Internal Revenue Service, *Regulations Relating to Depreciation, Treasury Decision No. 6182, 1964*; U.S. Treasury Department, Internal Revenue Service, *Depreciation Guidelines and Rules*, revised August 1964; U.S. Treasury Department release, "Treasury Liberalizes Depreciation Rules," and attached materials dated February 19, 1966.

### New Investment Depreciated With Accelerated Methods

	1954	1955	1956	1957	1958	1959	1960-66
	Percent						
Manufacturing: Equipment Structures	31	43	54	66	71	75	79
Nonmanufacturing: Equipment Structures	27 31	32 37	26 43	44 49	48 54	52 59	56 64

NOTE.—Excludes defense facilities amortized over a 60-month period.

These percentages are obtained from information compiled by IRS on the amount of depreciation claimed each year with the double-declining balance method and the sum-of-the-years-digits method. Experimentation showed that the two accelerated methods provided almost identical estimates of depreciation since 1954 so that it was not necessary to use both of them to obtain a satisfactory approximation.

### Service Lives

The term "service life" is used in two ways in this study: tax service life and actual service life. This section

deals with tax service life—the period over which depreciation on an asset is claimed on tax returns. At the end of its tax service life, an asset is fully depreciated for tax purposes. Subsequent sections of the study refer to actual service life, that is, the period over which an asset is retained in service by the business. Tax and actual service lives are not necessarily equal although IRS in general requires business to use tax lives that are approximately the same as actual service lives.

The discussion of the available evidence on which the estimates of tax service lives are based is organized as follows: (1) tax service lives prior to Treasury Decision 4422 in 1934, (2) tax service lives from 1934 to 1962, (3) 60-month amortization of defense facilities, and (4) the Guideline lives in 1962.

### Pre-1934 service lives

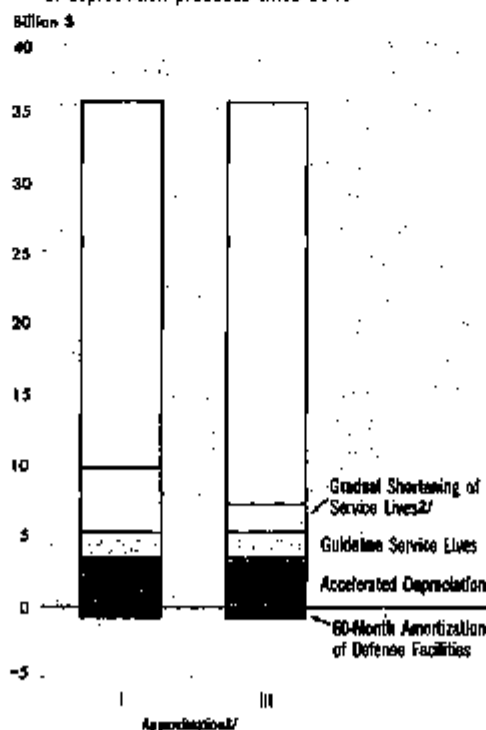
Depreciation was first allowed in the income tax law of 1909, and practice probably varied widely during the next two decades, when depreciation accounting was evolving. The IES published estimates of average service lives in the first edition of Bulletin F in 1920 and in a second edition in 1931. Little information is available as to how closely the tax service lives corresponded to these early IRS estimates. It is generally agreed that tax service lives during this period were shorter than those that resulted from Treasury Decision 4422 in 1934, but how much shorter is not known.

For the approximations, the tax service lives prior to 1934 were assumed to be the same as those used after 1934. This assumption has little effect on the computed estimates after World War II. Much of the investment made before 1934, particularly in the shorter lived equipment, was fully depreciated by the end of World War II; further-

CHART 6

### NA-IRS Corporate Depreciation<sup>1</sup> for 1966

\$6½ billion to \$9 billion due to liberalization of depreciation practices since 1940

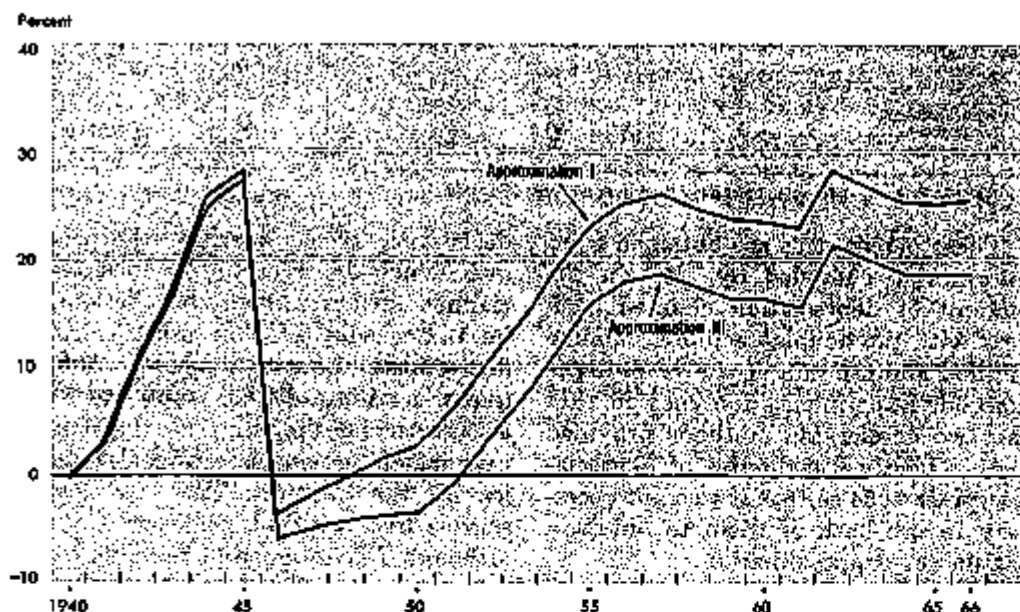


1. See footnote to table 2 for coverage.

2. See text for alternative assumptions about shortening of service lives.

CHART 7

# Percent of NIA-IRS Corporate Depreciation<sup>1/</sup> Due to Liberalization of Depreciation Practices Since 1940



1. See footnote to Table 2 for coverage.

U.S. Department of Commerce, Office of Business Economics

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more, the dollar amount of investment has been much greater in the postwar period than in earlier years.

## 1934-62 service lives

With Treasury Decision 4422 in 1934, the Treasury Department began to alter depreciation accounting practices substantially. Business was required to begin shifting from item accounting to group accounting and to use, on the average, longer service lives for both new and existing investment. These changes were also applicable to years prior to 1934 for which a corporation's book were still subject to audit. The result was to reduce depreciation allowances in the 1930's, leaving more to be recovered in later years.

In general, the third edition of Bulletin F, published in 1942, contained estimates of service lives that were longer than those given in the 1931 edition. In view of Treasury Decision 4422, the service lives in the 1942 edition of Bulletin F are probably indicative of the tax lives in the late 1930's as well as in the early 1940's although a firm, if it justified them, could use shorter lives than Bulletin F.

At some point in the 1940's or early 1950's, a decline in tax service lives set in, but little is known about when it began and whether its pattern and

timing was the same for manufacturing and nonmanufacturing and for equipment and structures. However, by the late 1950's, tax service lives were well below those of the 1942 edition of Bulletin F. On the basis of depreciation studies conducted by IRS, the average tax service life of new investment by corporations from 1954 to 1959 is estimated to have been almost 25 percent less than Bulletin F. The reductions from Bulletin F were larger for nonmanufacturing than manufacturing and for equipment than for structures, but all of these averages were within the range of 75 to 80 percent of Bulletin F.

During the 1950's, two developments contributed to the decline in tax service lives. In 1953, IRS issued a directive relaxing depreciation audit practices that probably resulted in shorter service lives for new investment. In 1954, the

adoption of accelerated depreciation methods began; the new methods required new depreciation accounts and in many instances probably led corporate management to review its depreciation practices and to adopt shorter tax lives. Some analysts feel that these two developments account for the decline in service lives and that little decline occurred before 1953.<sup>4</sup>

However, there is some evidence that tax service lives were declining during the 1940's. The ratio of gross stocks to straight line depreciation may be used as an estimate of the average service life of existing assets. Because of a shift in investment mix from structures to equipment, this ratio should have declined during the 1940's, but the ratio based on tax returns filed with IRS declines more than one would expect from the change in mix. This suggests that the tax service lives were not constant but were declining during the 1940's.

In view of the uncertainties about the gradual shortening of tax service lives, three approximations were computed on the basis of different assumptions. (See the table below.) In each, the percentage reductions of Bulletin F lives were assumed to be the same for structures as for equipment and the same for both manufacturing and nonmanufacturing. According to assumption I, tax service lives were constant at Bulletin F until 1940, declined to 85 percent of Bulletin F (abbreviated .85F) in 1952, and then more rapidly to 75 percent of Bulletin F (abbreviated .75F) in 1957. According to assumption II, tax service lives were constant at Bulletin F until 1952 and then declined to .75F in 1957. According to assumption III, tax service lives were constant at

4. George Turbough, *The Falling Boom in Corporate Tax Depreciation*, pp. 5-8.

Tax Service Lives Used in Approximations of NIA-IRS Depreciation, Selected Years  
(Percent of Bulletin F)

	All equipment and structures								Equipment		Structures
									Manufacturing	Nonmanufacturing	
	1940	1945	1950	1952	1955	1957	1960	1961	1962-66		
I.....	100	94	85	85	77	75	75	75	64	67	75
II.....	100	100	100	100	77	75	75	75	64	67	75
III.....	85	85	85	85	77	75	75	75	64	67	75

.85F until 1952 and then declined to .75F in 1957. These lives refer to the tax service lives applicable to new investment in the indicated years and not to the average of the tax lives of investment existing in those years.

#### 60-month amortization

From 1940 to 1945, investment in defense facilities under certificates of necessity could be amortized over 60 months. In addition, a 1945 statute retroactively permitted amortizable investment to be completely amortized during the period ending with 1945. Most amortizable investment made in 1945, for example, was completely written off that year. The provision for amortization was reinstituted during the Korean war and again in 1953, continuing until 1959. Amortization as reported to IRS is included in the NIA-IRS depreciation series. Since there are no direct estimates of the amount of investment that was amortized each year, it was necessary to prepare estimates of amortizable investment by working backwards from the amortization figures reported to IRS. In computing the approximations, the standard service lives were applied to a corporate investment total that was reduced by the estimated amount of amortizable investment. The resulting depreciation was then combined with amortization as reported to IRS.

#### Guideline service lives

In 1962, the Guidelines issued under Revenue Procedure 62-21 set forth new service lives for equipment that were 30 to 40 percent shorter than those suggested in Bulletin F. The new lives were applicable to both new investment and existing assets. Service lives of structures were not changed appreciably from Bulletin F.

In the approximations, allowances for the Guideline changes were made pragmatically. As compared with the lives previously in use, the service lives of investment in new equipment in 1962 and subsequent years were reduced by about 15 percent for manufacturing and about 10 percent for nonmanufacturing. The unused parts of the lives of old equipment in 1962 were reduced by the same percentages. These reductions in service lives resulted in increases from 1961 to 1962

in the computed depreciation components for manufacturing and nonmanufacturing that closely matched the increases in the actual IRS series.<sup>3</sup>

### The Computed Approximations

The results show that NIA-IRS depreciation can be closely approximated. Approximation I agrees remarkably well with the NIA-IRS series for the period after World War II. It is shown in the last panel in chart 8 on page 22, and all three approximations are shown in table 2.

Because of the different service life assumptions, the three computed approximations differ. Neither approximation II, based on constant Bulletin F lives through 1952, nor III, based on constant service lives of .85F, generates sufficient depreciation to follow the NIA-IRS series in the 1950's as closely as I, which is based on declining service lives. The approximations tend to support the hypothesis that tax service lives were declining prior to 1953. With approximation II, the service lives of the investment made after 1940 are too long to generate sufficient depreciation in the 1950's. With approximation III, more depreciation had already been taken on past investment than with I so that there was less undepreciated stock remaining in the 1950's on which to calculate depreciation. The approximations are assessed further in the appendix.

#### Effect of changes in practice

The approximations were calculated by stages so that the effect of each of the changes in depreciation practices could be assessed separately. In the first panel of chart 8, the NIA-IRS series is compared with depreciation computed on the assumption that the 1940 practices—Bulletin F service lives and straight line depreciation—remained in effect in subsequent years. This computed series is designated as line A. The differences between these two series since 1940 represent the effects of changes in depreciation prac-

tices, which the article attempts to explain.

In the second panel, line A is repeated. The net effect of 60-month amortization—the difference between the gross amount of amortization as reported to IRS and depreciation computed from estimates of amortizable investment using straight line depreciation and Bulletin F service lives—is added to line A to obtain line B.

The net effect of the gradual shortening of tax service lives before 1962 was taken as the difference between straight line depreciation (on all investment that was not amortized) computed with constant Bulletin F service lives and that computed with declining service lives. This difference is added to line B in the third panel to yield line C.

The net effect of accelerated depreciation was calculated after allowance for the gradual shortening in service lives. It was computed as the difference between double-declining balance and straight line depreciation applied to part of the new investment made since 1954. In the fourth panel, this difference is added to line C to obtain line D. The effect of the Guidelines was computed by making a further reduction in service lives of new and existing equipment in 1962. The additional depreciation so computed is added to line D in the fifth panel to yield line E, the end result of approximation I. In the sixth and last panel, the NIA-IRS series is shown again for comparison with line E.

The total effect of changes in depreciation practices is estimated in approximation I to have added about \$9 billion to depreciation charges in 1966, about one-quarter of corporate depreciation charges and 11 percent of corporate profits. About \$1½ billion is attributed to the Guideline service lives, about \$3½ billion to accelerated depreciation, and about \$4½ billion to the gradual shortening in service lives prior to the Guidelines. Net amortization of defense facilities was negative by about \$½ billion in 1966.

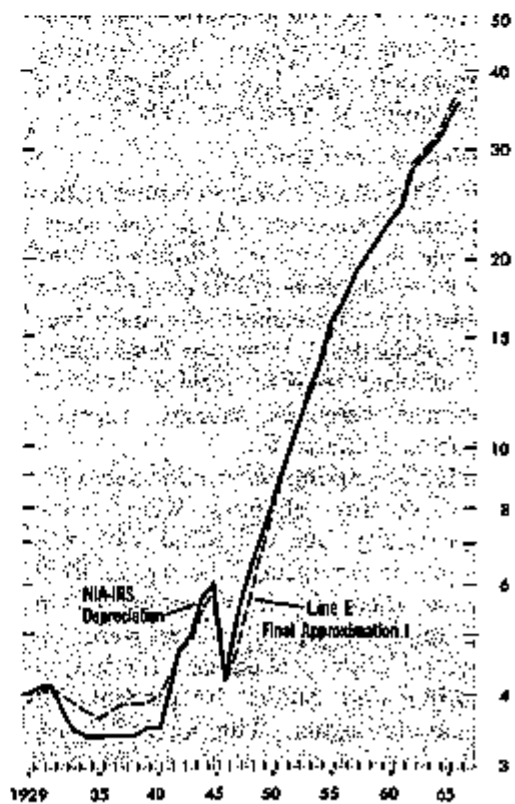
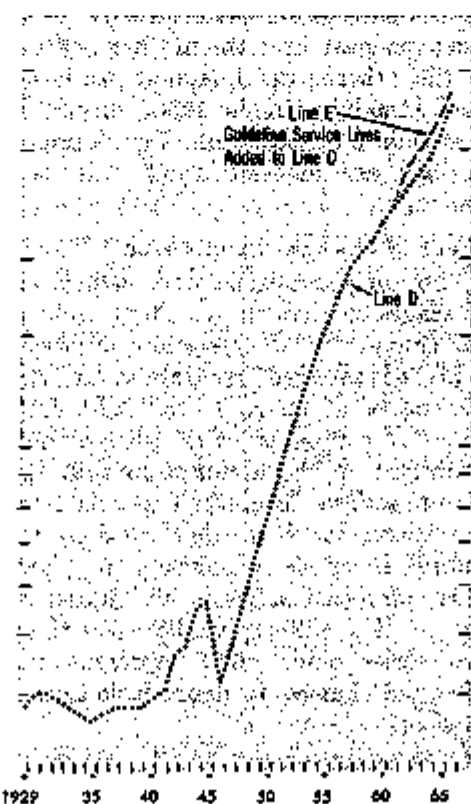
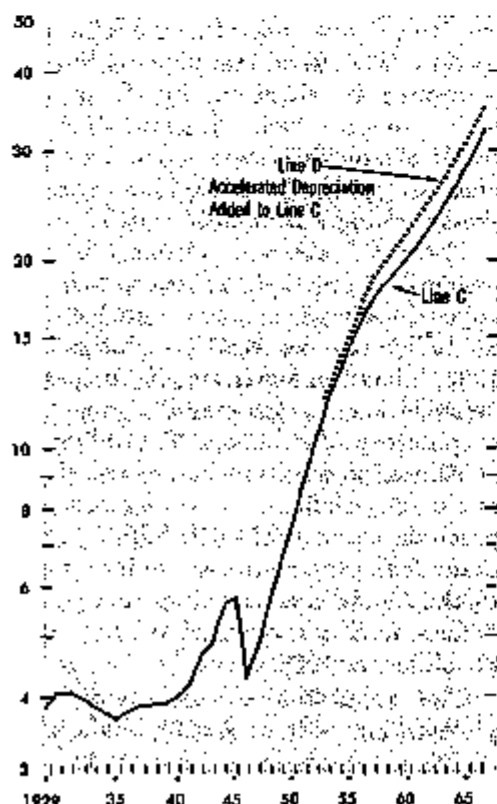
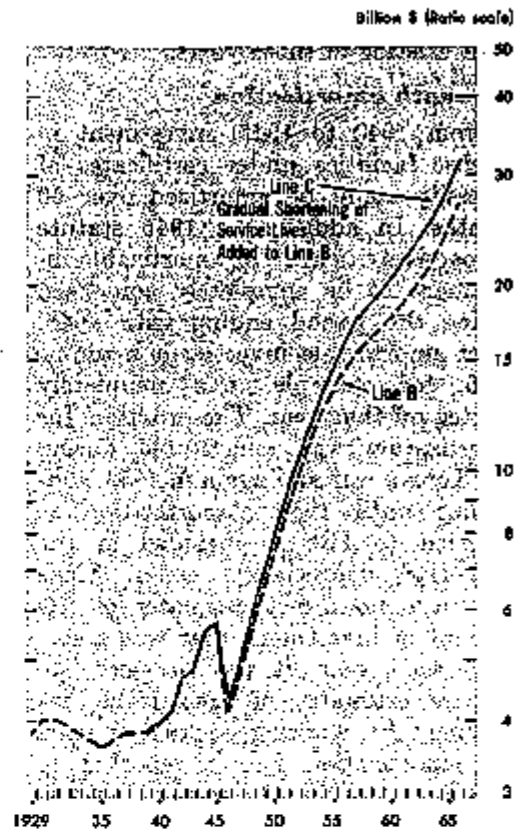
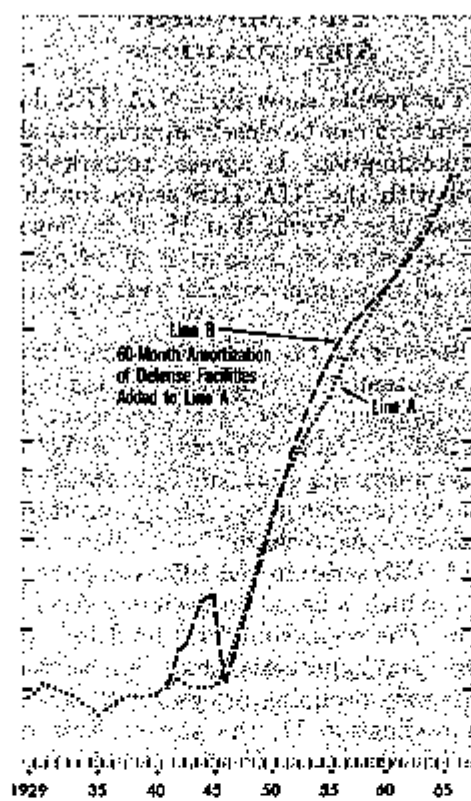
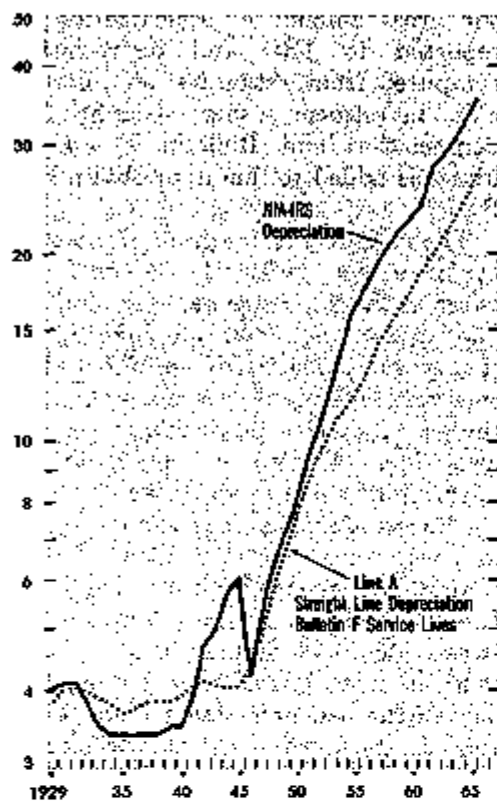
The Guideline service lives have yielded an estimated \$9½ billion in additional depreciation since 1962, and accelerated depreciation has resulted in about \$28 billion additional depreciation since 1954. Net amortization since

3. In the approximations, no explicit allowances were made for provisions in the Guidelines other than the reduction in service lives or for a feature of the investment tax credit of 1962 affecting depreciation. These other provisions were much less important than the reduction in service lives and are discussed in the appendix.



Derivation of Approximation of NIA-IRS Corporate Depreciation<sup>1</sup>

Billion \$ (Ratio scale)



1. See footnote to table 2 for coverage.

1940 has amounted to about \$9 billion. Finally, the total amount resulting from the gradual shortening of service lives—from Bulletin F service lives in 1940 to .75F in 1957—has been about \$40 billion.

Although the effects of the Guidelines, accelerated methods, and amortization in approximations II and III are about the same as in I, the amount of depreciation arising from the reductions in service lives differs. As indicated above, the results support the service life assumption in approximation I. The selection of appropriate service lives, however, remains uncertain, and the results of the other approximations provide a range within which the true figures probably fall. They suggest that if approximation I is in error, it is probably too high in most years. The three estimates of the total effect of declining service lives range from \$15 billion in approximation III to \$40 billion in I,

with the estimate in II at \$33 billion. The range for 1966 is from \$2 billion in III to \$4½ billion in II, with approximation I at \$4½ billion.

### Appendix

In this appendix, the approximation to NIA-IRS depreciation is assessed more fully than in the article and the methods and data used in the present study are described. Generally speaking, the section dealing with methods and data applies to both parts of the study; however, there are occasional references to matters discussed solely in part II.

### Further Evaluation of the Approximations

Approximation I was judged to be close to NIA-IRS depreciation in the period after World War II (table A). For the 1950's, it falls short of the

actual series in most years by an average of 1 percent per year. From 1960 to 1965, it exceeds the actual series by an average of 0.6 percent per year. Until 1961, approximation II falls short of the actual series by larger amounts than I; it then moves above I and exceeds the actual series by larger amounts than I. Approximation III runs at a lower level than I and falls short of the actual series every year until 1965.

Table A.—Percentage Differences<sup>1</sup> Between Approximations and NIA-IRS Series

[Averages computed with regard to sign]

	Approximation		
	I	II	III
1929-41.....	5.8	5.8	16.4
1942-49.....	-6.7	-7.4	-5.6
1950-59.....	-1.0	-6.5	-2.8
1960-65.....	.6	.6	-.6
1966.....	3.2	4.0	2.4

1. Difference equals approximation minus NIA-IRS as a percent of NIA-IRS.

Table B.—Approximations to NIA-IRS Corporate Depreciation (Billions of dollars)

Year	Approximation I							Approximation II							Approximation III							
	NIA-IRS depreciation	Straight line depreciation, Bulletin F lives	60-month amortization of defense facilities	Accelerated depreciation	Guideline service lives	Gradual shortening of service lives	Approximation I (2+3+4+5+6)	Difference (7-1)	Straight line depreciation, Bulletin F lives	60-month amortization of defense facilities	Accelerated depreciation	Guideline service lives	Gradual shortening of service lives	Approximation II (9+10+11+12+13)	Difference (14-1)	Straight line depreciation, Bulletin F lives	60-month amortization of defense facilities	Accelerated depreciation	Guideline service lives	Gradual shortening of service lives	Approximation III (16+17+18+19+20)	Difference (21-1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
1929	4.0	3.8					3.8	-0.1	3.8					3.8	-0.1	4.1					4.1	0.1
1930	4.1	4.0					4.0	-.1	4.0					4.0	-.1	4.3					4.3	.2
1931	4.1	4.0					4.0	-.1	4.0					4.0	-.1	4.3					4.3	.2
1932	3.8	3.9					3.9	.1	3.9					3.9	.1	4.1					4.1	.3
1933	3.5	3.8					3.8	.3	3.8					3.8	.3	4.0					4.0	.5
1934	3.4	2.7					2.7	-.7	2.7					2.7	-.7	3.8					3.8	.4
1935	3.4	2.6					2.6	-.8	2.6					2.6	-.8	3.8					3.8	.4
1936	3.4	2.7					2.7	-.7	2.7					2.7	-.7	3.8					3.8	.4
1937	3.4	2.8					2.8	.4	2.8					2.8	.4	3.9					3.9	.5
1938	3.4	2.8					2.8	.4	2.8					2.8	.4	3.9					3.9	.5
1939	3.5	2.8					2.8	-.7	2.8					2.8	-.7	3.9					3.9	.4
1940	3.6	3.0	6.0				3.9	.3	3.9	0.0				3.9	.3	4.0	0.0				4.0	.4
1941	3.9	4.0	.1			0.0	4.1	.2	4.0	.1				4.1	.2	4.1	.1				4.2	.3
1942	4.7	4.1	.6			0.0	4.6	-.1	4.1	.5				4.6	-.5	4.2	.5				4.7	.1
1943	5.0	4.0	.8			0.0	4.9	-.1	4.0	.9				4.9	-.9	4.1	.8				4.9	.1
1944	5.7	4.0	1.6			0.0	5.5	-.8	4.0	1.5				5.4	-.3	4.0	1.4				5.4	-.3
1945	6.0	4.0	1.7			0.0	5.7	-.3	4.0	1.7				5.7	-.3	4.1	1.6				5.7	-.3
1946	4.2	4.3	-.1			.1	4.1	-.1	4.3	-.2				4.1	-.2	4.4	-.3				4.1	-.1
1947	5.3	4.8	-.5			.1	4.7	-.6	4.8	-.3				4.6	-.7	5.0	-.3				4.7	-.5
1948	6.8	6.7	-.1			.2	6.7	-.1	6.7	-.3				5.4	-.9	6.0	-.3				6.7	-.6
1949	7.1	6.5	-.6			.3	6.7	-.5	6.5	-.3				6.3	-.8	7.0	-.3				6.7	-.5
1950	7.6	7.4	-.2			.6	7.7	.1	7.4	-.3				7.2	-.6	8.0	-.8				7.7	.1
1951	8.2	8.4	.2			.6	8.9	.7	8.4	-.5				8.4	-.2	9.0	.6				8.9	.7
1952	10.3	9.8	-.5			.7	10.3	.4	9.8	-.5				9.6	-.7	10.0	.4				10.3	.5
1953	11.9	10.1	-.9			.8	11.8	-.1	10.1	-.6			0.1	11.0	-.9	10.9	.8			6.0	11.7	.8
1954	12.6	10.9	1.3	0.3	1.0	13.6	13.6	1.0	10.9	1.3	0.3		.2	12.6	1.0	11.7	1.2	0.3		1.1	12.3	-.3
1955	15.9	11.7	1.7	.7	1.3	15.4	15.4	-.5	11.7	1.7	.0		.0	14.6	-1.3	12.7	1.6	.7		.3	15.2	-.7
1956	17.2	12.6	1.7	1.1	1.6	17.2	17.2	.0	12.6	1.7	1.1		1.0	16.6	-.6	13.9	1.8	1.1		.5	17.0	-.3
1957	19.0	14.1	1.4	1.6	1.8	19.0	19.0	.0	14.1	1.4	1.6		1.8	18.6	-.4	15.2	1.8	1.6		.7	18.6	-.3
1958	20.1	15.1	.9	1.9	2.2	20.1	20.1	.0	15.1	.9	1.9		2.2	19.8	-.3	16.4	1.9	1.9		.8	19.9	-.3
1959	21.6	16.1	.5	2.3	2.5	21.6	21.6	-.2	16.1	.5	2.3		2.2	21.0	-.6	17.4	.3	2.2		1.0	20.9	-.6
1960	22.7	17.4	.1	2.6	2.8	22.8	22.8	.1	17.4	.1	2.6		2.7	22.6	-.1	18.7	.0	2.5		1.2	22.4	-.3
1961	23.0	18.6	-.2	2.6	3.1	24.1	24.1	.1	18.6	-.2	2.6		3.1	23.1	-.5	20.1	-.3	2.6		1.4	23.3	.1
1962	27.5	19.9	-.4	2.8	3.4	27.7	27.7	.2	19.9	-.4	2.8		3.4	27.5	-.2	21.6	-.6	2.6	2.2	1.5	27.4	-.1
1963	29.0	21.4	-.6	2.7	3.6	28.2	28.2	-.8	21.4	-.6	2.7		3.7	29.3	.3	23.1	-.6	2.7	2.6	1.6	28.6	-.6
1964	30.9	22.1	-.7	2.9	3.8	30.8	30.8	-.1	22.1	-.7	2.9	1.8	4.0	31.3	.3	24.0	-.7	2.9	1.8	1.8	30.6	-.6
1965	38.2	25.3	-.8	3.2	4.2	33.6	33.6	-.4	25.3	-.8	3.2	1.8	4.4	33.8	.6	27.1	-.7	3.2	1.7	1.9	33.3	.1
1966	36.8	27.6	-.7	3.5	4.6	34.7	34.7	1.1	27.6	-.7	3.5	1.7	4.8	37.0	1.4	29.8	-.7	3.5	1.7	2.1	36.4	.9

Note.—NIA-IRS depreciation includes amortization and accidental damage to fixed capital; excludes depreciation on farm and residential properties owned by corporations.

Source: U.S. Department of Commerce, Office of Business Economics.

None of the approximations agrees closely with the increase in the NIA-IRS series from 1965 to 1966. The NIA-IRS series increases \$2.4 billion while the approximations show increases of about \$3.1 billion. Part of the discrepancy may be due to the preliminary nature of the NIA-IRS series. Final IRS tabulations for 1965 and preliminary tabulations for 1966 will not be available until later this year. Another possible explanation for part of the discrepancy is that the reserve ratio test and the restriction on open-end accounts with respect to overage assets may have reduced the depreciation deductions beginning in 1965. (This is discussed below.)

Although the approximations are shown back to 1929, the study did not attempt to approximate the NIA-IRS series closely in the years prior to 1940. The level of the NIA-IRS series in 1929 falls between the computed estimate based on Bulletin F lives and that based on .85F lives. The NIA-IRS series declines more than the computed series in the early 1930's and increases more in the 1940's. The larger decline and later increase are consistent with the effect of Treasury Decision 4422 and with two other factors that may be assumed to have affected the NIA-IRS series in the 1930's and 1940's. Reduced amounts of depreciation were taken with the units-of-production method in the 1930's, and there was probably a natural tendency for corporations showing losses to attempt to postpone depreciation to more prosperous years. A closer approximation could have been achieved in the 1930's if allowances had been made for the factors cited above.

In addition to comparing the approximations with the NIA-IRS series, two comparisons with independently derived estimates are possible. In a recent study based on balance sheets data from IRS, Norman Ture estimated that the accelerated methods contributed \$2.4 billion dollars of depreciation in 1959.<sup>6</sup> This figure compares with an estimate of \$2.2 billion in all three approximations. About half of the \$200 million difference is due to

the exclusion of farm and residential depreciation from the estimates presented in this article.

In a survey of corporations made by OBE in the spring of 1963,<sup>7</sup> it was estimated that the Guidelines contributed \$2.4 billion additional depreciation in 1962, which compares with a range of \$2.2 billion to \$2.3 billion in the approximations. Because corporations were able to switch to the Guidelines for the year 1962 until their books were no longer subject to audit, a larger discrepancy might result if a survey covering 1962 were taken now.

#### *Possible sources of error*

The uncertainties concerning the service lives used by corporations have already been indicated as a source of possible error in the approximations. Other possible sources of error include the following: (1) The computed approximations make no allowance for resale of used assets. On balance, these probably take place at prices higher than the depreciated values; they thus increase the net book value of the stock and result in larger depreciation deductions than if the original owner held the asset to retirement. (2) Simplifying assumptions were necessary with respect to the depreciation procedures used by business. As indicated below, each of 34 types of investment was assigned an average service life and retired in a range around the average on the basis of the Winfrey distribution. However, business procedures are more complex. Neither the group nor the item accounting methods used by business corresponds exactly to the procedures employed in the study. (3) The adjustments for changes in service lives and the switch to accelerated methods were made on the basis of averages. Actually, there is a good deal of dispersion about these averages, by both type of investment and industry, which could lead to somewhat different results. (4) No explicit allowances were introduced in 1962 for several aspects of the Guidelines and the investment tax credit since they would have

unduly complicated the procedures. Instead, the service lives were reduced in 1962 to provide a close match between the computed and actual increase from 1961 to 1962. The procedure may not provide a close agreement after 1962, but more information and probably the passage of a few more years are needed before this can be adequately assessed. Those aspects of Guidelines and the investment tax credit for which no explicit allowances were introduced are discussed below. (5) Underlying the study are several sources of data and a number of assumptions that were necessary in deriving the corporate share of total investment, the estimate of corporate residential depreciation, etc. All these involve problems as to definition, coverage, and statistical accuracy.

#### *Guidelines*

The Guidelines contained several provisions for which no explicit allowances were included in the approximations. These provisions are discussed below.

The Guidelines established about 75 asset classes and a suggested service life for each class. Most of the classes covered the equipment used by a particular industry, but a few classes covered types of depreciable assets in general use by business, such as office equipment, transportation equipment, and buildings. The service lives suggested in the Guidelines were 30 to 40 percent shorter than Bulletin F lives and also shorter than the lives being used by many firms.

A firm had the option of either continuing its previous procedures or adopting the Guidelines. In the present study, instead of regrouping part of the investment data for equipment to correspond to the new asset groups and applying the Guideline service lives to these new groups, all of the data were continued as 20 equipment groups as described below, and the service lives applicable to all investment were reduced. Because more use of the Guidelines was made by manufacturing firms than by nonmanufacturing firms, service lives were reduced more for manufacturing equipment than for non-manufacturing.

7. Lawrence Bridge, "New Depreciation Guidelines and the Investment Tax Credit," *SURVEY OF CURRENT BUSINESS*, July 1963.

6. Ture, *op. cit.*, pp. 82-86.



The Guidelines also established the reserve ratio test as a procedure for determining if a firm's depreciation rate under the Guidelines was excessive. Under the test, the ratio of the depreciation reserve to the gross value of the asset group is compared with a ratio based on expected or normal replacement practice. The reserve ratio test was originally scheduled to take effect in 1965, but the transition period was extended and the test was significantly modified when it became apparent that many firms would be unable to meet the test. One reason that some firms failed the original test was the exaggerated depreciation deductions arising from the inclusion of fully depreciated assets in group accounts. Assets that had been fully depreciated in item or year-of-acquisition accounts and that were still in use could be included in new group accounts established under the Guidelines. It was to the taxpayer's advantage to include the original value of such assets in new open-end group accounts and to depreciate the accounts with either the straight line or sum-of-the-years-digits method because in both of these methods the gross value of the assets is the base for calculating depreciation. For manufacturing corporations in 1963, about 20 percent of the additional depreciation arising from the Guidelines was estimated to be due to the inclusion of fully depreciated assets in group accounts and 80 percent to shorter lives.<sup>9</sup> When the transition period for the reserve ratio test was extended, the regulations were also changed so that new investment in 1965 and later years could not be added to open-end accounts being depreciated with either the straight line or sum-of-the-years-digits method. This made the accounts containing the fully depreciated assets closed end. Since the depreciation taken previously had been transferred to the new accounts, the depreciation reserves of these accounts were already high and would rapidly approach the gross value if there were no retirement of fully depreciated assets.

In the approximations, no allowances were made for depreciation arising

from fully depreciated assets or for the reserve ratio test. The effect of the reserve ratio test is generally considered to have been negligible. However, the presence of the test and the restriction on new additions to open-end group accounts after 1964 may have resulted in less depreciation being taken because of overage assets. The fact that the OBE approximations exceed the NIA-IRS figures in 1965 and 1966 lends support to this possibility.

#### *Investment tax credit*

Beginning in 1962, corporations were allowed an investment credit against their income tax. Initially, the depreciable base on which depreciation is computed was reduced by the amount of the tax credit. For corporations other than public utilities, the credit allowed was 7 percent of the investment in equipment with service lives of 8 years or more and less than 7 percent for equipment with service lives from 4 to 8 years. Property with lives of less than 4 years was not eligible for credit. The credit was limited to a certain percentage of profits; in addition, there were provisions for carrying the credit forward or backward to other tax years.

In 1964, the law was changed so that the depreciable base was no longer reduced by the amount of the tax credit and the reductions made in 1962 and 1963 were restored. This change shifted tax depreciation from 1962 and 1963 to later years—perhaps as much as \$100 million from 1962 and \$300 million from 1963. In the approximation, no adjustment was made in the depreciable base to take account of the initial provision in the investment tax credit or its revision in 1964.

#### *Methods and Sources of Data*

The present study draws on OBE's Capital Stock Study, which presented estimates of fixed capital stocks and related measures for all business excluding residential properties.<sup>10</sup> Where necessary, reference is made to the methods and data sources of the Capital Stock Study. Additional discussion of these

points may be found in the article describing the earlier study.

#### *Computation of depreciation*

The perpetual inventory method was used to compute the approximations to NIA-IRS depreciation in part I and the alternative measures of corporate capital consumption allowances in part II. In the perpetual inventory method, estimates of gross investment and of service lives are used to develop measures of stocks and depreciation. Gross stocks are obtained by cumulating gross investment in prior years and then subtracting gross investment in those assets that have completed their service lives. Depreciation charges are obtained by applying depreciation rates to the investment elements contained in the gross stock. Net stocks are obtained by subtracting from the value of gross stocks the cumulated depreciation on assets still in service.

Corporate investment figures for about 20 groups of equipment and 14 types of structures were used in the computations. For each type of investment, an average service life was used together with a distribution of the retirements or discards of assets about the average. The distribution used was a modification of the Winfrey S-3 curve,<sup>10</sup> a bell-shaped distribution with discards starting at 45 percent of the average service life and continuing until 155 percent is attained. For example, for investment with an average service life of 20 years, the assumption is that discards begin in the ninth year on a small scale and increase gradually, with the greatest concentration near the 20th year. The discards continue beyond the 20th year in declining amounts until the 31st year.

The service lives resulting from the Winfrey distribution were used in computing depreciation. In the above example, the investment discarded in the ninth year was fully depreciated over a 9-year service life. The investment discarded in the 31st year was fully depreciated over a 31-year service life.

9. Lawrence Gross, Irving Rottenberg, Robert C. Wasson, "New Estimates of Fixed Business Capital in the United States 1925-65," *SURVEY OF CURRENT BUSINESS*, December 1964.

10. Robley Winfrey, *Statistical Analysis of Industrial Property Retirement*, Iowa Engineering Experiment Station Bulletin 125, December 11, 1935, p. 104.

Three depreciation formulas were considered in the study. The straight line formula depreciates the value of an asset over its service life in equal annual amounts. The straight line formula may be written:

$$D_{t+i} = \frac{I_t}{n}$$

where  $D$  represents depreciation,  $I$  is an investment element contained in the gross stock,  $t$  is the year in which the investment was made,  $n$  is the service life, and  $i=0, 1, \dots, n-1$ .

The double-declining balance formula depreciates the net value of an asset by a constant percentage each year, which is twice the percentage taken in the first year with straight line depreciation. The double-declining balance formula may be written:

$$D_{t+i} = \frac{2}{n} \left(1 - \frac{2}{n}\right)^i I_t$$

where  $D$ ,  $t$ ,  $I$ ,  $n$ , and  $i$  are defined as in the straight line formula. With the double-declining balance formula, the net value never reaches zero. To write off the entire value, a convention that is available under IRS regulations was used. Depreciation was switched to straight line at the point where straight line depreciation of the remaining value results in a larger deduction than would the use of double-declining depreciation.

The sum-of-the-years-digits formula takes as depreciation a changing fraction of the original value of the asset each year. The numerator of the fraction changes each year to correspond to the remaining useful life, and the denominator, which remains constant, is the sum of all the years' digits in the service life. The sum-of-the-years-digits formula may be written:

$$D_{t+i} = \frac{n-i}{(1+2+\dots+n)} I_t$$

where  $D$ ,  $t$ ,  $I$ ,  $n$ , and  $i$  are defined as in the straight line formula.

The half-year convention was used in computing depreciation, but to simplify presentation it is not shown in the above formulas. With the half-year convention, all investment is

assumed to have occurred at midyear; a half-year of depreciation is taken in the first year and a half-year in the last year in which the asset is in service.

#### Service lives

The average service lives were based on the results of the Capital Stock Study; the derivation of these lives is discussed below. Average service lives based primarily on Bulletin F (1942 edition) were estimated for each of the 20 groups of equipment and 14 types of structures in the Capital Stock Study. The average life for each of the 19 broad types of nonfarm equipment was derived from the Bulletin F service lives assigned to individual types of equipment within the group. Altogether, service lives for about 180 detailed types of equipment were used in obtaining averages for the 19 groups. Averages were calculated with weights based on shipments data from the Census of Manufactures. The average life for farm equipment was derived from several Department of Agriculture studies.

Since the investment data for structures include both investment in new structures and investment in alterations and additions to existing structures, the average service life of the two is less than that for new structures alone as shown in Bulletin F. The service lives used were 20 percent shorter than Bulletin F for manufacturing structures and 7 percent shorter than Bulletin F for nonmanufacturing structures.

No allowance was introduced for alterations and additions to farm structures. The service lives of farm structures represent a compromise between Bulletin F lives and the shorter lives provided in the Guidelines.

Although in most instances the lives of the individual types of equipment were taken as constant over the period covered by the study, the average lives for the equipment groups change over time because of differences in asset composition. The average lives as described above are those referred to as Bulletin F service lives in the present study. Lives shorter than Bulletin F were prepared by taking a percentage of the Bulletin F service lives.

#### Derivation of corporate investment

The corporate investment estimates were prepared for the present study from the data on private fixed non-residential investment as shown in the national income and product accounts.

In the national accounts, nonresidential fixed investment is shown for 20 groups of equipment and 14 types of structures (tables 5.2 and 5.4 in the July 1967 Survey). These 34 series were separated into manufacturing, farm, and all other industries in the Capital Stock Study. This separation and the extension of the 34 series to years earlier than 1929 are described in the December 1966 Survey article. For the present study, these investment estimates—updated to include revisions that appeared in the July 1967 Survey—provided the starting point for developing corporate estimates of investment in fixed assets.

The disaggregation of investment into corporate and noncorporate components was accomplished by a variety of methods:

(1) Several investment series from the Capital Stock Study were wholly assigned to either the corporate or the noncorporate sector. For example, all investment in public utility structures was taken as corporate while all investment by nonprofit institutions was assigned to the noncorporate sector.

(2) Investment in automobiles was separated into corporate and noncorporate shares on the basis of information concerning corporate purchases of autos obtained in the 1957-58 plant and equipment surveys and in the 1957-58 surveys by the Federal Reserve System on the use of cars for business purposes by employees.

(3) Corporate and noncorporate shares of investment in petroleum and natural gas structures (largely oil wells) were based on the depletion allowances reported to IRS by corporate and noncorporate businesses.

(4) After special treatment of these items, the remaining investment components, each of which was already allocated among manufacturing, farm, and all other industries in the Capital Stock Study, were further allocated be-

tween corporate and noncorporate on the basis of five overall ratios for (a) manufacturing equipment, (b) manufacturing structures, (c) all other nonfarm equipment, (d) all other nonfarm structures, and (e) farm. Overall percentages were used since information is not available to separate the remaining investment components individually into corporate and noncorporate parts.

To prepare the manufacturing percentages, corporate and noncorporate investment in structures and in equipment—less those items handled separately in sections (1) through (3) above—were estimated for benchmark years from the 1954, 1958, and 1963 Censuses of Manufactures. Using wages and salaries plus net income of proprietors, the noncorporate estimates—since they were the smallest share—were interpolated between the benchmarks and extrapolated forward to 1966 and back to 1946. The noncorporate estimates were deducted from the annual totals used in the Capital Stock Study for plant and equipment to establish corporate investment for each year from 1946 to 1966. Overall corporate percentages were then computed for manufacturing equipment and manufacturing structures.

The corporate-noncorporate allocation for other nonfarm industries from 1946 to 1966 were derived from several sources: for trade and services, Census of Business data; for transportation and construction, mainly the OBE-SEC plant and equipment data; for the remaining industries, IRS depreciation figures. The noncorporate estimates were interpolated between benchmarks and extrapolated forward to 1966 and back to 1946 using either gross receipts or wages and salaries plus net income of proprietors, although some use was also made of the OBE-SEC plant and equipment survey. The noncorporate estimates were then deducted from the annual totals to arrive at corporate investment, and overall corporate percentages were computed for all other nonfarm equipment and all other nonfarm structures.

The corporate percentage for farms was based on IRS corporate farm depreciation and on total farm deprecia-

tion estimates of the Department of Agriculture, after the former had been adjusted to include only domestic farms and had been revalued in current prices.

The five corporate percentages derived by these processes were extrapolated from 1946 back to 1938 on the basis of the corporate and noncorporate capital consumption allowances and were held constant prior to 1938. The corporate percentages used for 1938 and 1966 are shown in table B. The resulting series of percentages were applied to the estimates of the 34 categories of investment for the entire span of over 100 years to derive the corporate share of each of these items.

Separate estimates of investment by financial and nonfinancial corporations were also required for this study. The basic technique employed was to measure investment by financial corporations as equal to the sum of the change in net stocks derived from successive balance sheets plus capital consumption allowances from income statements. Data from various government and private organizations were used for the several types of financial institutions. The sources included the Federal Deposit Insurance Corporation, Federal Reserve System, Internal Revenue Service, Institute of Life Insurance, and *Best's Fire and Casualty Aggregates and Averages*. The investment by financial corporations was allocated among

and deducted from the following corporate investment components: furniture, general industrial machinery, office and store equipment, service-industry machines, electrical machinery, automobiles, and commercial structures.

### Residential property

Estimates of the amounts accruing to corporate owners of residential property were deducted from the published figures pertaining to corporate profits, capital consumption, gross product, and income originating so that the coverage of these series would correspond to the computed depreciation measures. The residential estimates for corporations were obtained by allocating the components of gross product of tenant-occupied residential properties between corporate and other owners. The ratio of the stock of residential properties owned by corporations to the total tenant-occupied stock was used to allocate gross product, income originating, and the sum of depreciation and profits of tenant-occupied properties. The stock estimates were developed from information from the 1960 Survey of Residential Finance and the Flow of Funds Accounts of the Federal Reserve.

The split between profits and depreciation was based on the distribution between profits and depreciation shown for the 3-digit IRS industry Real Estate Owners and Operators.

The allocation of the residential estimates between financial and nonfinancial corporations was based on the ratio of the stock of housing owned by life insurance companies to the total corporate residential stock.

### Derivation of NIA-IRS corporate depreciation

Table C shows for the year 1966 the relationship between corporate depreciation as reported to IRS (line 1), corporate capital consumption allowances as published in the national accounts (line 5), and the NIA-IRS corporate depreciation used in Part I of this study (line 10). The NIA-IRS total is obtained by adding to IRS corporate depreciation an allowance for accidental damage to fixed capital and deducting capital consumption al-

Table B.—Percent of Nonresidential Investment Allocated to Corporations, 1938 and 1966

	1938	1966
<b>Manufacturing:</b>		
Equipment.....	12.0	22.9
Passenger cars not in IRS.....	91.8	92.4
Railroad.....	100.0	100.0
All other.....	12.0	93.9
Structures.....	37.8	96.7
<b>Nonfarm nonmanufacturing:</b>		
Equipment.....	65.9	77.7
Passenger cars not in IRS.....	87.4	83.1
Railroad.....	100.0	100.0
Nonprofit institutions.....	0	0
All other.....	65.9	77.7
Structures.....	82.9	65.2
Petroleum and natural gas well drilling and exploration.....	94.1	92.5
Public utilities.....	100.0	100.0
Nonprofit institutions.....	0	0
All other.....	74.3	65.2
<b>Farms:</b>		
All equipment and structures.....	2.0	7.9

lowances for both residential properties and farms owned by corporations.

Table C.—Relationship Between Corporate Depreciation Estimates, 1966  
(Billions of dollars)

Line	Item	Amount
1	IRS corporate depreciation <sup>1</sup>	35.2
2	Plus: Accidental damage to fixed capital	.0
3	Capital consumption allowances for oil and gas well drilling and exploration charged to current expense	1.6
4	Capital consumption allowances for passenger cars of employees reimbursed for travel expenses	.7
5	Equals: Corporate capital consumption allowances in national income accounts	37.5
6	Minus: Line 3	1.6
7	Line 4	.7
8	Capital consumption allowances for corporate firms	.2
9	Capital consumption allowances for residential properties owned by corporations	1.0
10	Equals: NIA-IRS corporate depreciation	35.6

1. Excludes depreciation reported by foreign branches of U.S. corporations.

2. Preliminary estimates prepared by OBE.

### Regional Changes in Personal Income

(Continued from page 18)

eral Government, and farming on changes in regional trends in total income from 1960-65 to 1965-66. A comparison of changes in the rate of personal income growth over the two periods with and without the component under evaluation provides a net measure that reflects both the weight of the component in the income structure and the acceleration in the rate of change in the component.

It is evident from the tabulation that the increased growth in manufacturing wages and salaries had by far the largest absolute effect on changes in the income aggregate both nationally and

regionally. It also contributed substantially to the narrowing of regional differentials in growth rates. Changes in Federal payrolls boosted the rate of growth in total income appreciably but tended to widen regional differentials by stimulating total income growth more in fast-growing than in slow-growing regions. Farm income, on the other hand, had no significant effect on the national income growth rate but contributed to uniformity by limiting the relative increase of total income in fast-growing regions.

### Income Changes in 1967

During 1967, when the national rate of economic advance slowed, and there was an actual decline in the output of durable goods, regional economic growth once again resembled its long term geographic pattern. That is, substantially larger relative income gains were again recorded in the West and South, and smaller ones in the northeast and north central regions. Over the course of the year, personal income rose 30 percent more in the three rapid-growth regions than in the other five areas—a differential about the same as that which prevailed over the longer span from 1948 to 1965.

#### Manufacturing expansion slows

The factors responsible for the re-emergence of long term trends in 1967 were generally the reverse of those operating in 1965-66. Most of last year's change in regional growth patterns is traceable to a substantial decline in the rate of expansion of factory payrolls (centering in durable goods) in the typically slow-growing regions and to a

near-continuation of the rate of expansion in manufacturing payrolls in the other regions. In addition, the small rise in farm income in the fast-growing regions combined with a small decline in the slow-growing areas in 1967 to widen regional trends in total income growth. Finally, the leveling off in Federal payrolls over the year tended to narrow regional trends in total income growth during 1967.

Table 6 shows State and regional changes in total income and in selected components from the first quarter of 1965 to the fourth quarter of 1966 and from the fourth quarter of 1966 to the fourth quarter of 1967.

#### Regional shifts within 1967

Developments within the year 1967 buttress the foregoing analysis. From the fourth quarter of 1966 to the second quarter of 1967—when the economy was sluggish and output of durables fell markedly—the rate of growth in the usually fast-growing regions exceeded that in the slow-growing regions by 40 percent. Thus, during the first half of the year, regional economic differences were even greater than those typical of the long term trend.

In contrast, when the economic advance again quickened and output of durables nearly made up their previous drop during the last half of 1967, regional rates of growth became more uniform. Over this two-quarter span, the rate of growth in the fast-growing regions exceeded that in slow-growing regions by about 10 percent. This pattern of regional growth is closely in line with that which prevailed during the economic expansion of 1965-66.